

1. List the members of your group below. Underline your name.
  
2. Provide a SQL script that creates tables `Accts(id, name, address)` and `Images(id, acct, size, loc)` for storing information on images (e.g., JPEG files) and the accounts to which they belong. Use suitable key and not-null constraints, and a constraint to ensure that image sizes are in the range  $(0, 1000]$ . Add statements to ensure that only accounts that own at least one image appear in `Accts` and, conversely, only images associated with a known account appear in `Images`. Also add statements to ensure that the total size of all images for any account is at most  $10^6$ . Finally, include statements to insert one account tuple and one image tuple.

[additional space for answering the earlier question]

3. Explain how the aggregate image size constraint of Question 2 may be enforced at the DBMS-level (not application level) by a database system that does not support SQL assertions, but that does support triggers.

4. Consider the following Datalog program and database instance:

$rpath(x,y) \leftarrow Edge(x, y, red).$   
 $rpath(x,y) \leftarrow rpath(x,z), rpath(z,y).$

- (a) Exhibit a minimal fixedpoint and a non-minimal fixedpoint for  $rpath$ .
- (b) Treating the Datalog rules as logical sentences ( $\leftarrow$  being the logical *if*), exhibit a non-minimal model and a minimal model that satisfies these sentences.

| Edge |   |       |
|------|---|-------|
| S    | D | color |
| 1    | 2 | red   |
| 1    | 5 | green |
| 2    | 3 | green |
| 2    | 4 | red   |
| 3    | 1 | red   |
| 3    | 2 | blue  |
| 3    | 4 | green |
| 4    | 1 | red   |
| 5    | 3 | red   |

[additional space for answering the earlier question]